

## CLAIMS

What is claimed is:

1. A spoked wheel for a bicycle, comprising:
  - a) a rim;
  - b) a hub;
  - c) a plurality of spokes tensed between the rim and the hub, each provided with a spoke attachment element for attachment to the rim; and
  - d) a plurality of seats formed as openings in the rim, each seat to house one of said spoke attachment elements;

wherein the shape and size of the spoke attachment elements and of the seats of the rim are such that:

the spoke attachment element is suitable for taking up a first configuration in which its insertion through the seat is possible; and

the spoke attachment element inserted in the seat is in a second configuration in which the spoke attachment element is substantially fixed with respect to the seat.

2. The wheel of claim 1, wherein the rim has two sides joined together on a base and a bridge extending between the two sides so as to define an inner chamber enclosed between the bridge, the sides and the base, the openings of the seats being formed in the base, open to the inner chamber.

3. The wheel of claim 1, wherein the spoke attachment element comprises:
  - a) a shank;
  - c) a head which is widened with respect to the shank; and
  - c) a contact plate provided with a hole;

wherein the hole in the plate is narrow enough to prevent the slipping of the head from the plate, and the hole is large enough to allow the plate to take on both an attachment position substantially perpendicular to the shank in the second

configuration of the spoke attachment element, and an insertion position which is inclined with respect to the attachment position in the first configuration of the spoke attachment element.

4. The wheel of claim 1, wherein the spoke attachment element comprises:

- a) a widened head formed on the spoke; and
- b) a contact plate provided with a hole;

wherein the hole in the plate is narrow enough to prevent the slipping of the head from the plate, and the hole is large enough to allow the plate to take on both an attachment position substantially perpendicular to the spoke in the second configuration of the spoke attachment element, and an insertion position inclined with respect to the attachment position in the first configuration of the spoke attachment element.

5. The wheel of claim 3, wherein in the attachment position the shank is free to rotate with respect to the plate, about a longitudinal axis of the spoke.

6. The wheel of claim 3, wherein in the attachment position the plate cannot rotate with respect to the rim.

7. The wheel of claim 1, wherein the seat has an elongated shape.

8. The wheel of claim 7, wherein the shape of the seat is elongated in a transverse direction with respect to a circumferential extension of the rim.

9. The wheel of claim 3, wherein the head has a conical contact surface with the plate and the plate has a corresponding conical contact surface with the head.

10. The wheel of claim 3, wherein the hole in the plate has at least one notch for receiving the spoke in the insertion position.

11. The wheel of claim 3, wherein the spoke attachment element comprises a contact washer between the head and the plate.

12. The wheel of claim 3, wherein the spoke attachment element of each spoke comprises a nipple, in adjustable screwing engagement with the spoke, the nipple including the head and the shank and being coupled to the plate.

13. The wheel of claim 3, wherein the spoke attachment element of each spoke comprises a barrel, in attaching engagement with the spoke, the barrel including the head and the shank and being coupled to the plate.

14. The wheel of claim 3, comprising a sealing gasket in each seat of the rim, around each spoke attachment element.

15. A rim of a spoked wheel for a bicycle, comprising a plurality of seat openings formed in the rim, each seat being suitable for housing a spoke attachment element, wherein the seats have an elongated shape.

16. The rim of claim 15, wherein the shape of the seats is elongated in a transverse direction with respect to a circumferential extension of the rim.

17. The rim of claim 15, comprising two sides joined together on a base and a bridge extending between the two sides which define an inner chamber enclosed between the bridge, the sides and the base, the openings of the seats being formed in the base, open to the inner chamber.

18. A spoke set for a bicycle wheel comprising:

a) a stem; and

b) a spoke attachment element connected to the stem for attaching the spoke to a rim which includes a plurality of seats;

wherein the spoke attachment element is suitable for taking up a first configuration in which its insertion through one of the seats of the rim is possible; and

wherein the spoke attachment element is suitable for being put in a second configuration in which the spoke attachment element is substantially fixed with respect to the seat.

19. The spoke set of claim 18, wherein the spoke attachment element comprises:

a) a shank;

b) a head which is enlarged with respect to the shank; and

c) a contact plate provided with a hole;

wherein the hole in the plate is narrow enough to prevent the slipping of the head from the plate, and the hole in the plate is large enough to allow the plate to take on both an attachment position substantially perpendicular to the spoke in the second configuration of the spoke attachment element, and an insertion position inclined with respect to the attachment position in the first configuration of the spoke attachment element.

20. The spoke set of claim 18, wherein the spoke attachment element comprises

a) a widened head formed on the spoke; and

b) a contact plate provided with a hole;

wherein the hole in the plate is narrow enough to prevent the slipping of the head from the plate, and the hole in the plate is large enough to allow the plate to take on both an attachment position substantially perpendicular to the spoke in the second

configuration of the spoke attachment element, and an insertion position inclined with respect to the attachment position in the first configuration of the spoke attachment element.

21. The spoke set of claim 19, wherein the shank is free to rotate with respect to the plate, about a longitudinal axis of the spoke.

22. The spoke set of claim 19, wherein the head has a conical contact surface with the plate and the plate has a corresponding conical contact surface with the head.

23. The spoke set of claim 19, wherein the hole in the plate has at least one notch for receiving the stem of the spoke in the insertion position.

24. The spoke set of claim 19, wherein the spoke attachment element comprises a contact washer between the head and the plate.

25. The spoke set of claim 19, wherein the spoke attachment element of each spoke comprises a nipple, in adjustable screwing engagement with the spoke, the nipple including the head and the shank and being coupled to the plate.

26. The spoke set of claim 19, wherein the spoke attachment element of each spoke comprises a barrel, in attached engagement with the spoke, the barrel including the head and the shank and being coupled to the plate.

27. The spoke set of claim 18, comprising a gasket around each spoke attachment element, intended for sealing the seat of the rim where the spoke is mounted.

28. Process intended for manufacturing a spoked wheel for a bicycle, comprising the steps of:

- a) providing a rim with a plurality of seats formed by openings in the rim;
- b) providing a plurality of spoke attachment elements for the attachment to the rim in the plurality of seats;
- c) placing each spoke attachment element in a first configuration,
- d) inserting the spoke attachment in the first configuration through a predetermined opening; and
- e) holding the spoke attachment element facing said predetermined opening.

29. The process of claim 28, further comprising the step of:

- b1) providing a false-spoke associated with the respective spoke attachment element before placing the spoke attachment element in the first configuration.

30. The process of claim 28, further comprising the step of:

- f) applying a holding element to the spoke attachment element.

31. The process of claim 30, further comprising the step of:

- g) repeating steps b) to f) for all the spokes of the wheel.

32. The process of claim 31, further comprising the steps of:

- h) providing a hub,
- k) associating all the spokes of the wheel with the hub,
- l) associating each spoke with a respective spoke attachment element.

33. The process of claim 32, further comprising the step of:

- m) placing the spoke attachment element in a second configuration in which it cannot be removed through the seat.

34. The process of claim 33, further comprising the step of

n) tensioning the spoke.

35. The process of claim 30, further comprising the step of:

o) removing holding elements from the spoke attachment elements.

36. The process of claim 29, wherein the false-spoke has a stem with a smaller cross-section with respect to the cross-section of the spoke.

37. A spoked wheel of a bicycle, comprising:

a rim which includes a base and a plurality of seats formed from openings in the base;

a hub;

a plurality of spokes, connecting the hub and the rim in tension, each of the spokes including a first end connected to the rim and a second end connected to the hub;

a plurality of plates, shaped to pass through the openings when positioned at a first angle and to engage the seats when positioned at a second angle, each of the plates is located on an interior surface of the base and includes an inner hole which is substantially aligned with a respective one of the plurality of seats; and

a plurality of rim facing spoke attachment elements, each connected to the first end of one of the plurality of spokes and substantially aligned with one of the inner holes of one of the plurality of plates, and includes a contact surface which contacts a respective one of the plurality of plates on a side opposite the base.

38. The spoked wheel according to claim 37, wherein the rim further comprises two sides extending from the base and a bridge joining the two sides, whereby an inner chamber is defined by the base, two sides, and the bridge.

39. The spoked wheel according to claim 37, wherein each of the inner holes of the plurality of plates are sized to receive a respective one of the spokes.

40. The spoked wheel according to claim 39, wherein each of the plates includes at least one notch on a perimeter of its respective hole to allow rotation of a respective one of the plates at the first angle while in receipt of the respective one of the spokes.

41. The spoked wheel according to claim 37, wherein each of the plurality of rim facing spoke attachment elements further includes a head carrying the contact surface, a shank connected to the head which projects through the opening toward the hub, and a polygonal peripheral surface located on the shank on an end opposite the head.

42. The spoked wheel according to claim 37, wherein each of the contact surfaces of the rim facing elements cooperates with a contact surface of a respective one of the plates to allow free rotation of the respective one of the rim facing elements.

43. The spoked wheel according to claim 37, wherein each of the plurality of spokes further includes a threaded portion located on the first end, and each of the plurality of rim facing elements further includes a tapped portion which engages the threaded portion.

44. The spoked wheel according to claim 37, wherein each of the plurality of spokes further includes a threaded portion located on the second end and a stem located on the first end which rigidly connects with the rim facing element, and wherein the hub includes a plurality of tapped portions which connect to the threaded portion of each of the spokes.



45. The spoked wheel according to claim 37, further comprising a plurality of sealing gaskets, each connected to a respective one of the openings in the base.

46. The spoked wheel according to claim 37, wherein each of the plurality of spokes includes a widened head on the first end which cooperates with the respective one of the plates to retain a respective one of the plurality of rim facing spoke attachment elements.

47. The spoked wheel according to claim 45, further comprising a plurality of auxiliary washers, one of each of the washers is positioned on a respective one of the spokes between the respective one of the rim facing spoke attachment elements and a respective one of the widened heads.

48. A method for assembling a spoked wheel of a bicycle comprising:  
providing a rim which includes a base and a plurality of seats formed from openings in the base, a hub, a plurality of spokes which include a first and second end, a plurality of plates including an inner hole, and a plurality of rim facing spoke attachment elements including a shank and a head having a contact surface;  
inserting each of the rim facing elements through a respective one of the openings in the base;

positioning each of the plates at a first position angle relative to a respective one of the openings in the base and inserting each of the plates through the respective opening into an inner chamber of the rim;

positioning each of the plates at a second position angle relative to the respective opening in the base to secure each of the plates on an interior surface of the base, and aligning the inner hole of each of the plates with a respective one of the seats of the rim;

withdrawing the shank of each of the rim facing attachment elements through the inner hole of a respective one of the plates and through the respective opening in the base, and engaging the contact surface of the head of each of the rim facing attachment elements with a contact surface of the respective one of the plates;

connecting the second end of each of the spokes to the hub and connecting the first end of each of the spokes to the rim facing attachment element.

49. The method according to claim 48, further comprising the step of temporarily connecting each of the rim facing elements to a threaded end of a false-spoke prior to the step of inserting each of the rim facing elements.

50. The method according to claim 49, wherein the step of positioning each of the plates at a first position angle includes the step of temporarily slideably connecting each of the plates to the false-spoke.

51. The method according to claim 50, further comprising the step of disconnecting each of the rim facing elements from a respective false-spoke subsequent to the step of withdrawing the shank of each of the rim facing attachment elements and prior to the step of connecting each of the spokes.

52. The method according to claim 48, further comprising the step of connecting a sealing gasket to each of the openings in the base.

53. The method according to claim 48, further comprising the steps of providing each of the spokes with a threaded portion on the first end and providing each of the rim facing attachments with a tapped portion, and wherein the step of connecting the spokes includes the steps of mating the threaded and tapped portions and rotating each of the rim facing attachment elements to tension the spokes.

54. The method according to claim 53, further comprising the step of providing a polygonal peripheral surface on each of the shanks on an end opposite the head, and wherein the step of rotating each of the rim facing attachment elements includes the step of engaging the polygonal surface with a tool to apply torque.

55. The method according to claim 48, further comprising the steps of providing each of the spokes with a threaded portion on the second end and providing the hub with a plurality of tapped portions, and wherein the step of connecting the spokes includes the steps of mating the threaded and tapped portions and rotating each of the rim facing attachment elements to tension the spokes.

56. The method according to claim 48, further comprising the step of attaching a holding element to each of the rim facing attachment elements subsequent to the step of withdrawing the shank and prior to the step of connecting the spokes.

57. A kit for attaching a spoke to a rim of a spoked wheel for a bicycle, comprising a spoke attachment element wherein the shape and size of the spoke attachment element and a seat of the rim is such that:

the spoke attachment element is suitable for taking up a first configuration in which its insertion through the seat is possible; and

the spoke attachment element inserted in the seat is in a second configuration in which the spoke attachment element is substantially fixed with respect to the seat.

58. The kit of claim 57 further comprising a false spoke.